

Tehachapi Slender Salamander (*Batrachoseps stebbinsi*)

Legal Status

State: Threatened

Federal: Bureau of Land
Management Sensitive

Critical Habitat: N/A

Recovery Planning: N/A

Notes: The recently completed (October 2011) U.S. Fish and Wildlife Service (USFWS) 12-month finding for Tehachapi slender salamander (*Batrachoseps stebbinsi*) to determine whether it should be federally listed as threatened concluded that a listing as threatened was not warranted (76 FR 62900–62926).



Courtesy of Gary Nafis.

Taxonomy

The current description of the Tehachapi slender salamander (*Batrachoseps stebbinsi*) as a distinct species is relatively recent (Brame and Murray 1968). The taxonomy of Tehachapi slender salamander, however, is uncertain, and there is some evidence that Tehachapi slender salamander populations may represent two species. The existence of two species of *Batrachoseps* in the Tehachapi Mountains (in addition to the black-bellied salamander [*B. nigriventris*]) may have been recognized as early as 1858 (Wake and Jockusch 2000). Genetic work on speciation in *Batrachoseps* indicates a complex pattern of separation and contact among different species, which complicates the taxonomy of the genus. Wake and Jockusch (2002) examined the mitochondrial DNA gene cytochrome *b* for all 18 *Batrachoseps* species and several undescribed species and found that populations were more isolated in the past than they are now, indicating that there was some speciation occurring while separated. The recent contact and merging by male-mediated gene flow is confounding the genetic analysis. Hansen and Wake (2005) had suggested that the two populations centered in the Caliente Creek

area and in the Tehachapi Mountains, respectively, represent two distinct species based on differences in genetics, size, and coloration. However, in the recent 12-month finding of whether Tehachapi slender salamander should be federally listed as threatened, the USFWS evaluated the most recent available genetic and morphological information about differences between the two populations. USFWS's review included a personal communication with Hansen, who currently believes that there are insufficient differences between the two populations to classify them as separate species or subspecies (76 FR 62900–62926). Based on this review, USFWS concluded that the two populations of Tehachapi slender salamanders should be treated as a single species at this time. For the 12-month finding, USFWS assigned the Caliente Canyon and Tehachapi Mountains populations to two Distinct Population Segments (DPSs): the Tehachapi Mountains DPS and the Caliente Canyon DPS, which together constitute the entire range of the species (76 FR 62900–62926).

A description of the species' physical characteristics can be found on the CaliforniaHerps (2011) website or Stebbins (2003).

Distribution

General

The Tehachapi slender salamander is endemic to California and is reported to occur only in Kern County, although Morey (2005) indicates that the species could extend south into Los Angeles County. The California Natural Diversity Database (CNDDB) includes occurrences for elevations ranging from 1,610 feet in the Caliente Creek area to 5,575 feet in the Tehachapi Mountains (CDFW 2013) (Figure SP-R7).

The Tehachapi slender salamander occurs in two main DPSs that are geographically separated: (1) in the Caliente Creek drainage in the Paiute Mountains at the junction of the Sierra Nevada and Tehachapi mountains and (2) in the Tehachapi Mountains extending west to Fort Tejon State Park (76 FR 62900–62926).

The CNDDB contains a total of 20 records for Tehachapi slender salamander (CDFW 2013), all of which are documented from Kern

AMPHIBIANS

Tehachapi Slender Salamander (*Batrachoseps stebbinsi*)

County. These occurrences were documented from 1957 to 2012 and all are considered extant, although their current presence has not been verified (CDFW 2013). Within the Caliente Canyon DPS, Tehachapi slender salamander has been recorded from 13 discrete localities at elevations of 1,610 to 6,000 feet (CDFW 2013).

HerpNet, a collaborative effort by natural history museums to establish a global network of herpetological collections data involving 64 institutions, includes 92 museum records for Tehachapi slender salamander. These records range from 1914 to 1979 (HerpNet 2010). Record localities include Live Oak Canyon in the Tehachapi Mountains; 6.3 miles southeast of Keene Store on U.S. 466; west of and southeast and southwest of Paris-Lorraine/Lorraine; along Caliente Creek Road; Fort Tejon; east of Caliente; northeast of Lebec at the mouth of Bear Trap Canyon; Caliente Canyon; near Caliente junction of Bealville Road and California Bodfish Road; and Tejon Canyon, 6.6 miles above Indian School (HerpNet 2010).

Distribution and Occurrences within the Plan Area

Historical

The Desert Renewable Energy Conservation Plan (DRECP) Area includes the eastern portion of the Tehachapi slender salamander's geographic range (Figure SP-R7). There is one historical (i.e., pre-1990) occurrence of the Tehachapi slender salamander in the Plan Area: a record from 1957 on private land from the Tehachapi Pass area near State Highway 58 (Dudek 2013). It was initially reported by Brame and Murray (1968) that the site was covered by a road, but as of 2008, the site was not covered by a road and remained in good condition, consisting of foothill pine (*Pinus sabiniana*), interior live oak (*Quercus wislizeni*), and California buckeye (*Aesculus californica*), as well as blue oak (*Quercus douglasii*) in open areas (CDFW 2013).

Recent

There are five recent (i.e., since 1990) records for the species in the Plan Area (Figure SP-R7): (1) a 2007 occurrence located in talus on the south side of Caliente Creek Road near the mouth of Big Last Chance Canyon (this site could also be considered historical because it was first

AMPHIBIANS

Tehachapi Slender Salamander (*Batrachoseps stebbinsi*)

reported by Brame and Murray (1968)); (2) a 2009 occurrence located between Tollgate Canyon and Stevenson Creek about 7 miles north-northeast of State Highway 58; (3) a 2011 occurrence located in Silver Creek; (4) a 2011 occurrence located in Indian Creek; and (5) a 2011 occurrence in an unnamed canyon south of Indian Creek. The 2007 and 2009 occurrences are on Bureau of Land Management (BLM) lands (CDFW 2013), and the three most recent occurrences are on private land (76 FR 62900–62926; Dudek 2013). The three 2011 occurrences described in the USFWS 12-month finding extend the range of the Tehachapi slender salamander approximately 7 miles to the southeast of Caliente Canyon, but these are still considered part of the Caliente Canyon DPS (76 FR 62900–62926).

Natural History

Habitat Requirements

The Tehachapi slender salamander inhabits moist canyons and ravines in oak and mixed woodlands (see Table 1; CaliforniaHerps 2011). Vegetation in occupied habitat includes foothill pine, canyon live oak (*Quercus chrysolepis*), interior live oak, blue oak, Fremont cottonwood (*Populus fremontii*), western sycamore (*Platanus racemosa*), and California buckeye (Evelyn, pers. comm. 2012; Hansen and Wake 2005). At higher elevation sites, Tehachapi slender salamander has also been found with white fir (*Abies concolor*) (Evelyn, pers. comm. 2012). In more exposed areas of Caliente Creek, habitat includes California juniper (*Juniperus californica*), yucca (*Yucca* spp.), bush lupine (*Lupinus* spp.), and buckwheat (*Eriogonum* spp.). In the lower elevation Caliente Creek areas, the species is restricted to the lower margins of north-facing slopes and side canyons among granitic or limestone talus and scattered rocks (Hansen and Wake 2005). The species also occurs on north-facing slopes in the Tehachapi Mountains within talus piles and fallen wood (Hansen and Wake, pers. comm. 2008; Hansen and Wake 2005). The understory forb miner's lettuce (*Claytonia perfoliata*) is commonly found at occupied sites (Brame and Murray 1968).

During the moist periods of fall, winter, and spring precipitation, individuals seek cover under surface objects, especially rock talus (Brame and Murray 1968). Other substrates that may be used for cover include rocks, logs, bark, and other debris in moist areas

AMPHIBIANS

Tehachapi Slender Salamander (*Batrachoseps stebbinsi*)

(CaliforniaHerps 2011), but they are primarily associated with talus (Hansen and Wake, pers. comm. 2008; Hansen and Wake 2005).

Specific habitat requirements for breeding or egg laying for this species are not well documented. Similar species lay their eggs underground or on moist substrates underneath or within surface objects, especially pieces of bark (Stebbins 1972).

It is unknown how or whether juvenile Tehachapi slender salamander habitat differs from that of adults. Juveniles are rarely found, which may indicate that hatching occurs in the spring, as surface activity declines, and that juveniles may remain underground (Hansen and Wake 2005).

Table 1. Habitat Associations for Tehachapi Slender Salamander

| Land Cover Type | Land Cover Use | Habitat Designation | Habitat Parameters | Supporting Information |
|--|--------------------|----------------------------------|---|---|
| Juniper woodland, Blue oak-foothill pine woodland, Mixed oak woodland, Riparian woodland | Primary habitat | Active and inactive season | North-facing talus and rocky slopes, 40% to 100% crown cover (species may be present even if the overall aspect of a slope faces east, south, or west, as long as there is a small draw that is shaded (usually north-facing) | Hansen and Wake 2005; Hansen and Wake, pers. comm. 2008; CaliforniaHerps 2011; Evelyn, pers. comm. 2012 |

Note: Land cover types are a necessary but not sufficient condition for occurrence. The Tehachapi slender salamander is closely associated with talus and rocky slopes.

Foraging Requirements

Although the Tehachapi slender salamander's specific feeding habits are unknown, related species feed on small arthropods, such as spiders and mites, insects (especially collembolans, coleopterans, and hymenopterans), earthworms, and snails (Cunningham 1960; Adams 1968). The Tehachapi slender salamander primarily forages under surface objects, such as pieces of bark or flat talus rocks, in moist areas or in leaf litter. *Batrachoseps* are generally sit-and-wait predators (CaliforniaHerps 2011); they search or wait for small insects and other invertebrates under surface objects (USFS 2006). Salamanders may enter termite tunnels and earthworm burrows when foraging (Morey 2005). It is assumed that the Tehachapi slender salamander, similar to all *Batrachoseps* species observed thus far, capture small invertebrates using a projectile tongue (Hansen and Wake 2005). As a semifossorial species, the Tehachapi slender salamander is able to enter termite tunnels, earthworm burrows, and other small openings not accessible to larger salamanders. They may compete with juvenile salamanders of other species where their ranges overlap (Morey 2005).

Reproduction

Reproduction by *Batrachoseps* species is terrestrial (Hansen and Wake 2005). Eggs are laid in moist places under surface objects and neonates hatch fully formed (USFS 2006; CaliforniaHerps 2011). The breeding season of the Tehachapi slender salamander is suspected to be from about November to February, with peak activity in November and December, but the timing of reproduction is likely climate related (see Table 2). The Tehachapi slender salamander probably lays eggs during the rainy periods of winter and early spring (Morey 2005). Breeding activity may extend into May at higher elevation and at sites with moist conditions. Clutch size remains unknown, although related salamanders lay eggs in clusters of 4 to 21 (Stebbins 1954; USFS 2006).

Although nest sites have not been directly observed, eggs are likely deposited deep within the rock talus and litter matrix typical of Tehachapi slender salamander microhabitat (Hansen and Wake 2005). Tehachapi slender salamanders may build communal nests,

AMPHIBIANS

Tehachapi Slender Salamander (*Batrachoseps stebbinsi*)

which have been reported for the sympatric black-bellied salamander (Jockusch and Mahoney 1997).

Table 2. Key Seasonal Periods for Tehachapi Slender Salamander

| | Jan | Feb | March | April | May | June | July | Aug | Sep | Oct | Nov | Dec |
|-------------|-----|-----|-------|-------|-----|------|------|-----|-----|-----|-----|-----|
| Breeding | X | X | X | X | X | | | | | | X | X |
| Aestivation | | | | | X | X | X | X | X | X | | |

Notes: Surface and breeding activity likely is associated with precipitation and may extend into May with high precipitation and at higher elevations and sites with moist conditions. During dry years or extended periods of drought, salamanders may remain below the surface.

Sources: Hansen and Wake 2005; Morey 2005.

Spatial Activity

The Tehachapi slender salamander is not thought to be territorial (USFS 2006), although females of related species are often found in the immediate vicinity of egg clusters (Morey 2005). Tehachapi slender salamander home ranges are suspected to be approximately 0.5 acre (USFS 2006), with individuals moving no more than about 164 feet in their lifetime (Hansen and Wake, pers. comm. 2008). The area of Tehachapi slender salamander surface activity probably covers its area of underground activity (Morey 2005). In similar slender salamander species, up to 15 individual territories have been located within a 1,076-square-foot area (Hansen and Wake, pers. comm. 2008).

The activity patterns of the Tehachapi slender salamander are largely dependent upon precipitation patterns, which are erratic in both timing and amount within the species' range (Hansen and Wake 2005). Surface activity closely relates to the onset of the rainy season, which generally occurs around November or December (Hansen and Wake 2005). At lower elevations this rainy season may be rather brief (2 to 3 months) (Hansen and Wake 2005). Due to the relative dryness of its habitat, the Tehachapi slender salamander may have a shorter activity period than other slender salamanders (CaliforniaHerps 2011). During the moist period (November to May) the Tehachapi slender salamander can be found nocturnally active on the surface,

although periods of surface activity vary from year to year (Morey 2005). March and April generally marks the salamander's peak surface activity, although it can extend into May in wet years or at higher elevations (e.g., upper reaches of Pastoria and Tejon Creek drainages, Tehachapi Mountains) (Hansen and Wake, pers. comm. 2008). During drier periods, salamanders retreat underground to moist seepages (Morey 2005). In years of below-average rainfall or consecutive years of drought, salamanders may not appear under surface cover at all, but rather retreat to subterranean refugia (Morey 2005; Hansen and Wake 2005). The portion of the species' range in the Plan Area is lower elevation and drier than the more westerly and higher elevation portions of its range, and it is expected to spend more time underground in this part of its range.

Ecological Relationships

All known Tehachapi slender salamander localities overlap the range of the yellow-blotched salamander (*Ensatina eschscholtzii croceater*) (Hansen and Wake 2005). Both species occupy similar habitats, but yellow-blotched salamanders have a more extensive distribution. In some areas where yellow-blotched salamanders are abundant, Tehachapi slender salamanders do not occur; conversely, where Tehachapi slender salamanders are locally abundant there are few yellow-blotched salamanders. Tehachapi slender salamanders and yellow-blotched salamanders are the only salamanders present in Caliente Canyon, although black-bellied slender salamanders and possibly gregarious slender salamanders (*Batrachoseps gregarious*) are believed to occur nearby (Hansen and Wake 2005). Within the Tehachapi Mountains, Tehachapi slender salamanders and black-bellied slender salamanders are sympatric in the Pastoria and Tejon Creek drainages, at Fort Tejon in Grapevine Canyon, and possibly elsewhere (Jockusch 1996; Wake and Jockusch 2000) but do not hybridize (Hansen and Wake, pers. comm. 2008). Tehachapi slender salamanders are habitat specialists, whereas black-bellied slender salamanders occupy a broader distribution. The sympatric relationship between these two species is notable given that it is the only case of sympatry involving members of the same species group of *Batrachoseps* (Wake and Jockusch 2000).

AMPHIBIANS

Tehachapi Slender Salamander (*Batrachoseps stebbinsi*)

Primary predators of the Tehachapi slender salamander are most likely small snakes such as the ring-necked snake (*Diadophis punctatus*) (Hansen and Wake 2005). Other potential predators of both adults and juveniles include beetle larvae and other predatory arthropods, diurnal birds (especially birds that forage through leaf litter), and small mammals (Morey 2005).

Population Status and Trends

Global: Imperiled (NatureServe 2010)

State: Same as above

Within Plan Area: Unknown

Population trends of the Tehachapi slender salamander are unknown. However, all documented occurrences are considered to be extant, although individual populations are small and localized (Hammerson 2009). No ecological or population studies have been conducted that would provide specific information about population status and trends.

Threats and Environmental Stressors

Tehachapi slender salamander populations are restricted to seasonally shaded, north-facing slopes of canyons located in otherwise arid to semi-arid terrain where talus occurs. The small and localized nature of these populations, which occur at a limited number of sites, makes them highly susceptible to habitat disturbance caused by development. The USFWS analyzed the threat to Tehachapi slender salamander posed by proposed development in the 12-month finding (76 FR 62900–62926). The only known potential development-related threats to the species are the proposed Tejon Mountain Village residential and commercial development in the Tehachapi Mountains. The USFWS found that under a worst-case scenario only 2.8% of suitable habitat for the species would be impacted by the Tejon Mountain Village development and concluded that this level of impact would not threaten the Tehachapi Mountains DPS (76 FR 62900–62926).

Within the Plan Area, identified threats at two of the recent (2007, 2009) documented sites include possible erosion from the paved road at the site south of Caliente Creek Road (CDFW 2013). The CNDDB (CDFW 2013) indicates that the area of the Tollgate Canyon/Stevenson

AMPHIBIANS

Tehachapi Slender Salamander (*Batrachoseps stebbinsi*)

Creek site is proposed for wind energy development (CDFW 2013). However, the USFWS 12-month finding does not identify wind energy development as a potential threat at this site (76 FR 62900–62926). The sites at Silver Creek, Indian Creek, and the unnamed canyon south of Indian Creek are on private lands. Based on site photographs, the Silver Creek and Indian Creek sites appear to be in fair to good condition because grazing occurs at the sites, but there are no signs of other activities, such as buildings, roads, or mining (76 FR 62900–62926). The site at the unnamed canyon south of Indian Creek appears to be in good condition based on site photographs. This site is on BLM land and there is no evidence of grazing, nor is it within a BLM grazing allotment (76 FR 62900–62926). No other threats were identified for these new sites.

Tehachapi slender salamander habitat is also potentially threatened by feral pig (*Sus scrofa*) (Hansen and Wake, pers. comm. 2008), road construction, mining, and cattle grazing, as well as flood control projects (Hansen and Stafford 1994; Jennings 1996). Hansen and Wake (pers. comm. 2008) considered feral pigs to be the main threat to Tehachapi slender salamander in the Tehachapi Mountains.

The USFWS analyzed the potential effects of climate change on the Tehachapi slender salamander in the 12-month finding (76 FR 62900–62926). Based on the climate models, temperatures in the Tehachapi Mountains are expected to increase, but the effect of climate change on precipitation is less certain. There is a high level uncertainty as to how these changes will affect Tehachapi slender salamander (76 FR 62900–62926). While any specific effects on the species remains speculative, the USFWS concluded that some loss of habitat may occur in more exposed canyon areas, but that habitat will remain in the most shaded, lower portions of the canyons and that the species may also be able to shift within canyons in response to climate change (76 FR 62900–62926).

Conservation and Management Activities

Three of the five recent occurrences in the Plan Area are on BLM land. (the 2007 and 2009 occurrences and the 2011 occurrence in the unnamed canyon south of Indian Creek). BLM Manual 6840 establishes Special-Status Species policy for plant and animal species

AMPHIBIANS

Tehachapi Slender Salamander (*Batrachoseps stebbinsi*)

and the habitat on which they depend (BLM 2001). The objectives of the BLM policy are:

- A. To conserve listed species and the ecosystems on which they depend.
- B. To ensure that actions requiring authorization or approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list any special status species, either under provisions of the ESA or other provisions of this policy (BLM 2001).

The BLM has identified the Tehachapi slender salamander as a sensitive species and requires surveys in suitable habitat areas prior to authorizing activities that could impact the species or its habitat. However, because the species is not federally listed, the BLM is not legally required to avoid or mitigate agency-related impacts (74 FR 18336–18431).

The Tehachapi Upland Multiple Species Habitat Conservation Plan (TU MSHCP) would cover occupied Tehachapi slender salamander habitat west of the Plan Area. The TU MSHCP, currently under review by the USFWS, would conserve and manage approximately 3,507 acres (95%) of modeled suitable habitat for the species on Tejon Ranch, and all currently documented locations of Tehachapi slender salamander (Monroe and Bear Trap canyons) would be protected in open space. The protection and management of modeled suitable habitat for the Tehachapi slender salamander would occur in the context of the much larger open space system planned for Tejon Ranch, which would ultimately preserve up to 240,000 acres of the 270,000-acre ranch per the Tejon Ranch Conservation and Land Use Agreement (TRC et al. 2008). As currently proposed, the TU MSHCP (Dudek 2009) would also implement avoidance, minimization, and mitigation measures for the species and its modeled suitable habitat during development and long-term operation of the Tejon Mountain Village Project, including:

- Avoidance of ground disturbances in modeled suitable habitat except as necessary for road crossing and culverts
- Implementation of best management practices (BMPs) to protect surface water quality

AMPHIBIANS

Tehachapi Slender Salamander (*Batrachoseps stebbinsi*)

- Pre-construction surveys and relocation of detected individuals to suitable habitat outside construction areas, and biological monitoring during all ground-disturbing activities within modeled suitable habitat areas
- Design features between development and modeled suitable habitat to avoid and minimize adverse edge effects, such as exotic plant and animal species (e.g., Argentine ant [*Linepithema humile*]) and controls on lighting adjacent to open space
- Implementation of a grazing management plan to maintain habitat for the species
- Homeowner education and controls on recreational activities and pets
- Environmental baseline surveys
- Minimization of infrastructure impacts in open space and use of BMPs for the design and installation of such infrastructure
- Selection of appropriate locations for public access, trails, and facilities to minimize impacts to open space areas.

Data Characterization

Little occurrence data are available for the Tehachapi slender salamander, and the special details of its life history are largely unknown (Hansen and Wake 2005). As discussed previously, there are 16 occurrence records for the species in the CNDDB (CDFW 2013) and three very recent occurrence records included in the USFWS 12-month finding (76 FR 62900–62926). Much of the potential habitat area is on private lands and not readily accessible to biologists (Hansen and Wake 2005). However, even when broad-scale focused surveys are conducted for the species, detections are few. Detection of this species is difficult, even where it is present. Surveys need to take place during the right time of year when conditions are appropriate and be carried out by people with experience finding the species (Evelyn, pers. comm. 2012). For example, focused surveys for the species were conducted within the approximately 26,400-acre Tejon Mountain Village project area in 2007. Focused surveys were conducted in 60 drainages considered to support suitable habitat for the species, but it was documented in only one of the 60 drainages (i.e., Monroe Canyon) (Jones & Stokes 2008).

Within this survey area, there are only four other documented occurrences in the CNDDDB (CDFW 2013). This species is only active on the surface for a limited time period during the wet season and spends most of its life underground. Detecting individuals on a large scale would require unacceptable and destructive survey methods (e.g., excavations and turning up rocks and other materials), although it is feasible that some type of systematic or random sampling regime to minimize habitat damage could be used. To date, no such sampling regime has been implemented.

As described previously, there are six occurrence records for the species in the Plan Area, including one historic record and five recent records (note that the Big Last Chance Canyon record is considered recent because the species was last detected there in 2007; it was first reported by Brame and Murray (1968)).

Management and Monitoring Considerations

As described previously, BLM Manual 6840 provides policy direction for management of sensitive species, including Tehachapi slender salamander (BLM 2001). The BLM policy is to use the best available scientific information for adequate review of a land-use plan or other proposed agency action. This may include baseline studies, management, and monitoring of management actions. Management should consider potential ongoing threats, such as livestock grazing, which can degrade the woodland and riparian habitats occupied by the Tehachapi slender salamander, including vegetation structure, soils, microhabitat (e.g., talus and rocks), and water quality. Other considerations for management and monitoring include potential adverse edge effects in suitable habitat, such as erosion and polluted runoff into habitat areas, including pesticides and other chemicals. Because this species breathes through its highly permeable skin, it is likely highly vulnerable to environmental toxins and dust mediated through the air and water that can be absorbed through the skin. Lighting can make this nocturnal species more visible to predators. Invasive plant and animal species can degrade habitat, displace native species, and result in increased predation (e.g., pet and feral cats). Development or other land uses that facilitate both authorized and unauthorized public access to occupied areas can result in habitat

degradation (e.g., disturbance of talus slopes and drainages) and impacts to individuals (e.g., illegal collecting). For wind energy projects, for example, when siting turbines, new access roads need to be considered in addition to the actual turbine footprint. In steep terrain, road construction could decimate a hillside and potentially disrupt multiple discrete populations of Tehachapi slender salamander. Therefore, prior to road design, potential routes should be thoroughly surveyed for potential Tehachapi slender salamander habitat (Evelyn, pers. comm. 2012).

Management also should focus on maintaining existing habitat connectivity among occupied areas to the extent feasible. Because this species is likely very sedentary (Hansen and Wake 2005), it is probably not capable of dispersing long distances through unsuitable or marginal habitat. It is likely that local populations are already naturally isolated by unsuitable habitat. Development and land uses that are incompatible with occupation may fragment habitat and further isolate small populations, potentially leaving them vulnerable to local extinction due to lack of gene flow, inbreeding depression, reduced genetic diversity, and genetic drift.

Species Modeled Habitat Distribution

This section provides the results of habitat modeling for Tehachapi slender salamander, using available spatial information and occurrence information, as appropriate. For this reason, the term “modeled suitable habitat” is used in this section to distinguish modeled habitat from the habitat information provided in Habitat Requirements, which may include additional habitat and/or microhabitat factors that are important for species occupation, but for which information is not available for habitat modeling.

There are 47,883 acres of modeled suitable habitat for Tehachapi slender salamander in the Plan Area. Appendix C includes a figure showing the modeled suitable habitat in the Plan Area.

Literature Cited

- 74 FR 18336–18431. Proposed Rule: “90-Day Finding on a Petition to List the Tehachapi Slender Salamander (*Batrachoseps stebbinsi*) as Threatened or Endangered. April 22, 2009.
- 76 FR 62900–62926. “Endangered and Threatened Wildlife and Plants; 12-Month Finding on Petition to List the Tehachapi Slender Salamander as Endangered or Threatened.” October 11, 2011.
- Adams, D.R. 1968. “Stomach Contents of the Salamander *Batrachoseps attenuatus* in California.” *Herpetologica* 24:170–172.
- BLM (Bureau of Land Management). 2001. Manual 6840 – Special Status Species Management.
- Brame, A.H. Jr., and K.F. Murray. 1968. “Three New Slender Salamanders (*Batrachoseps*) with a Discussion of Relationships and Speciation within the Genus.” *Bulletin of the Los Angeles County Museum of Natural History and Sciences* 4:1–35.
- CaliforniaHerps 2011. “*Batrachoseps stebbinsi* – Tehachapi Slender Salamander.” CaliforniaHerps.com: California Reptiles and Amphibians. Accessed April 4, 2011.
<http://www.californiaherps.com/salamanders/pages/b.stebbinsi.html>.
- CDFW (California Department of Fish and Game). 2013. “*Batrachoseps stebbinsi*.” Element Occurrence Query. California Natural Diversity Database (CNDDB). RareFind, Version 4.0 (Commercial Subscription). Sacramento, California: CDFW, Biogeographic Data Branch. Accessed September 2013. <http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp>.
- Cunningham, J.D. 1960. “Aspects of the Ecology of the Pacific Slender Salamander, *Batrachoseps pacificus*, in Southern California.” *Ecology* 41:88–99.

Dudek. 2009. *Tehachapi Upland Multiple Species Habitat Conservation Plan*. Draft. Section 7, "Conservation Plan for Other Covered Species." Prepared for Tejon Ranch Corporation. Encinitas, California: Dudek. January 2009.

Dudek. 2013. "Species Occurrences–*Batrachoseps stebbinsi*." DRECP Species Occurrence Database. Updated September 2013.

Evelyn, C. 2012. Personal communication (profile review comments) from C. Evelyn. May 18, 2012.

Hammerson, G. 2009. "*Batrachoseps stebbinsi*." The IUCN Red List of Threatened Species. Version 2011.1. Accessed July 1, 2011.
<http://www.iucnredlist.org/apps/redlist/details/2648/0>.

Hansen, R.W., and R. Stafford. 1994. "Tehachapi slender salamander," pp. 254–255. Edited by C.G. Thelander. In *Life on the Edge: A guide to California's endangered natural resources*. Biosystems Books (author). Berkeley, California: Heyday Books. April 1994.

Hansen, R.W., and D.B. Wake. 2005. "*Batrachoseps stebbinsi* Brame and Murray, 1968: Tehachapi Slender Salamander," pp. 693–695. Edited by M. Lanoo. In *Amphibian Declines: The Conservation Status of United States Species*. University of California Press, Berkeley.

Hansen, R.W., and D.B Wake. 2008. Personal communication to Brock Ortega (Dudek) regarding Tehachapi slender salamander and yellow-blotched salamander at Ventura FWS office. June 19, 2008.

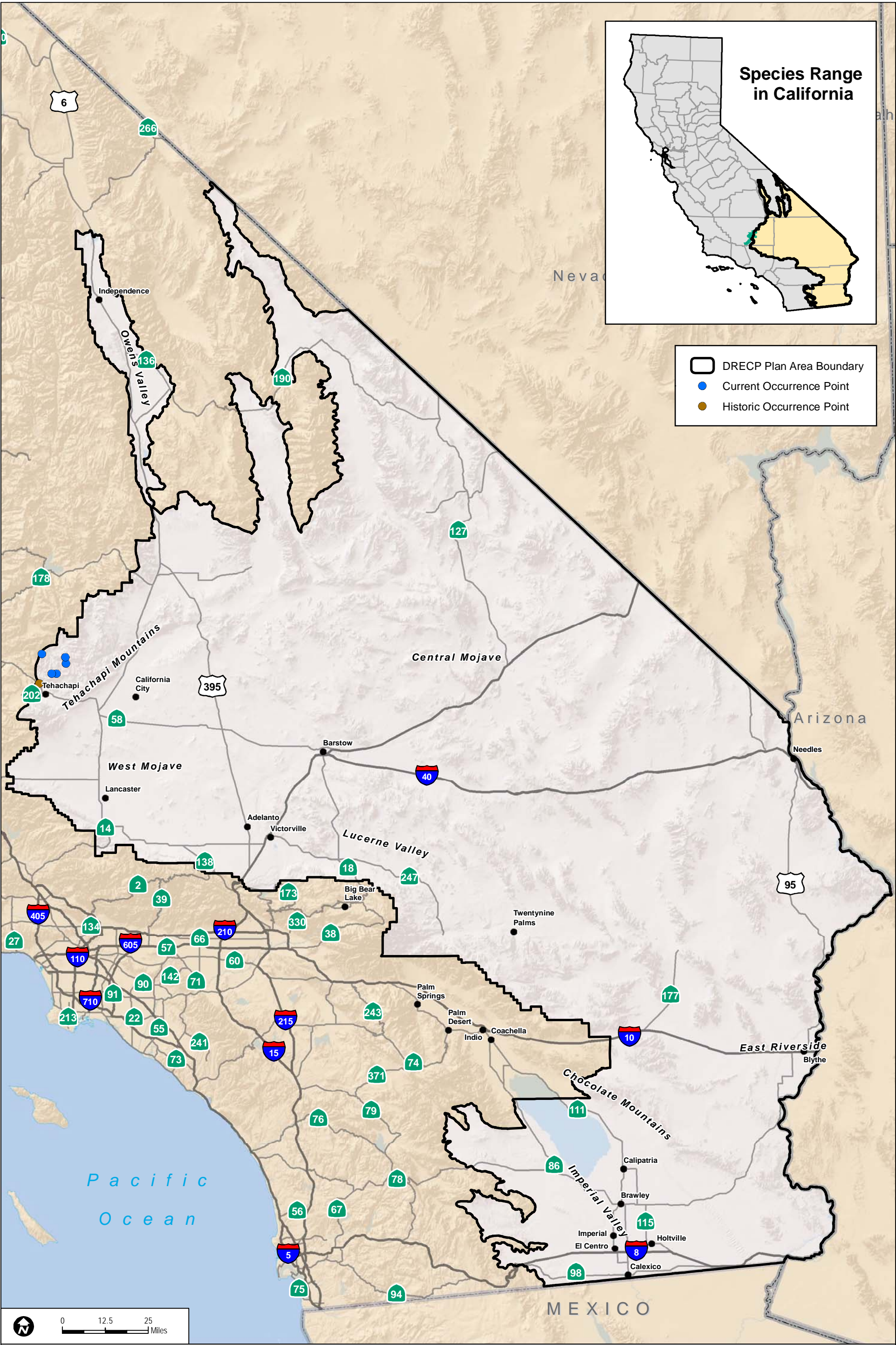
HerpNet. 2010. Data for *Batrachoseps stebbinsi* obtained from the Arctos – MVZ Herp Catalog. California Academy of Sciences (CAS) – CAS Herpetology Collection Catalog. Updated August 13, 2010. Accessed July 5, 2011, through the HerpNet2 Portal. www.herpnet2.org.

- Jennings, M.R. 1996. "Status of Amphibians," pp. 921–944. In *Sierra Nevada Ecosystem Project: Final Report to Congress, Volume II, Assessments and scientific basis for management options*. Davis, California: University of California, Davis, Centers for Water and Wildland Resources.
- Jockusch, E.L. 1996. "Evolutionary Studies in *Batrachoseps* and Other Plethodontid Salamanders: Correlated Character Evolution, Molecular Phylogenetics, and Reaction Norm Evolution." PhD dissertation; University of California, Berkeley.
- Jockusch, E.L. and M.J. Mahoney. 1997. "Communal Oviposition and Lack of Parental Care in *Batrachoseps nigriventris* (Caudata: Plethodontidae) with a Discussion of the Evolution of Breeding Behavior in Plethodontid Salamanders." *Copeia* 1997:697–705.
- Jones & Stokes. 2008. *Final Draft Results of Focused Salamander Surveys and Habitat Assessment at Tejon Mountain Village*. Prepared by Jones & Stokes for Dudek.
- Morey, S. 2005. *Tehachapi Slender Salamander*. "CWHR Life History Accounts and Range Maps." Online database.
<http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.asp>.
- NatureServe. 2010. "*Batrachoseps stebbinsi*." "NatureServe Explorer: An Online Encyclopedia of Life" [web application]. Version 7.1. Arlington, Virginia: NatureServe. Accessed February 2011.
<http://www.natureserve.org/explorer>.
- Stebbins, R.C. 2003. *A Field Guide to Western Reptiles and Amphibians*. New York, New York: Houghton Mifflin Company.
- Stebbins, R.C. 1954. *Amphibians and Reptiles of Western North America*. New York, NY: McGraw-Hill.
- Stebbins, R.C. 1972. *California Amphibians and Reptiles*. Berkeley, California: University of California Press.

TRC (Tejon Ranch Conservancy), Sierra Club, National Audubon Society, Natural Resources Defense Council, and Endangered Habitats League. 2008. *Final Tejon Ranch Conservation and Land Use Agreement*. June 2008.

USFS (U.S. Forest Service). 2006. "Tehachapi Slender Salamander." Arcata, California: Pacific Southwest Research Station Redwood Sciences Laboratory.

Wake, D.B., and E.L. Jockusch. 2000. "Detecting Species Borders Using Diverse Data Sets: Examples from Plethodontid Salamanders in California," pp. 95–119. Edited by R.C. Bruce, R.G. Jaeger, and L.D. Houck. In *The Biology of Plethodontid Salamanders*. New York, NY: Kluwer Academic/Plenum Publishers.



Sources: ESRI (2014); DRECP Species Occurrence Database (2013), CWHR (2008)

FIGURE SP-A01
Tehachapi Slender Salamander Occurrences in the Plan Area